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FLAT, FLEXIBLE, ABSORBING LAMINATED COMPOSITE MATERIALS

The present invention relates to a flat, flexible, laminated composite material.

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Such laminated composite materials are known in many forms, for example as non-woven fabrics, felts, bonded fabrics, creel composite materials or laminated materials (bondings).

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Such known laminated composite materials are either not watertight or, if they contain a water-impermeable layer, are uncomfortable to wear since water collects on the side of the laminated composite material next to the user, who 15 finds this unpleasant.

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Although textiles containing a laminated composite material are already known (e.g. nappies or liners), these textiles have only a limited area of application however. A basic 20 textile material from which textiles for individual areas of application may subsequently be produced is not provided by these known textiles.

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The object of the present invention is accordingly to develop a laminated composite material of the type mentioned in the introduction so that it is watertight and at the same time is comfortable to wear.

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This object is achieved according to the invention by a laminated composite material having the features disclosed in claim 1.

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The mode of action of the laminated structure according to the invention is however comparable to that of the known textiles mentioned hereinbefore: body fluid released by the user is distributed by diffusion in the liquid-absorbent layer so that there is no undesirable accumulation of body fluid at points where the user comes into contact with the laminated composite material. The liquid-impermeable layer

in turn prevents the body fluid from seeping through the laminated composite material and thereby wetting or soaking other substances or objects that are arranged on the side of the laminated composite material remote from the user.

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An unpleasant odour due to escaping fluid may possibly also be prevented by the containment of the body fluid in the liquid-absorbent layer.

10 The laminated composite material is versatile and may be used for example as a bed inlay or sheet, or also as a textile material to be worn possibly over a conventional nappy.

15 The development according to claim 2 is a particularly simple and inexpensive realisation of the liquid-impermeable layer. Depending on the sheet material that is employed (plastics, metal, etc.) the sheet in the laminated composite material may also fulfil a supporting function.

20 When using thin polymer sheets, for example of polyethylene, thin and flexible laminated composite materials can be fabricated.

25 A high degree of wearer comfort combined with a high liquid absorption capacity of the laminated composite material is achieved by the detailed design of the laminated composite material according to claim 3. The projecting fibres of the pile keep the user's body surface at a predetermined distance from the liquid-impermeable layer, so that contact 30 between the body surface and the liquid-impermeable layer, with the associated danger of accumulation of fluid, is reliably prevented.

35 Once again, both the wearer comfort and liquid absorption capacity are improved by the detailed design according to claim 4. In this connection the term fleecy material is

understood to denote a woollen pile that is substantially higher than the pile of a normal velour material.

With the liquid-absorbent layer according to claim 5, there
5 is again a good wearer comfort combined with a high liquid absorption capacity.

The detailed design of the laminated composite material according to claim 6 additionally has the function of
10 releasing a substance. The amount released as well as the duration of the release can be controlled via the stability of the coating of the microcapsules. Suitable substances include for example menthol extracts, to facilitate breathing, aroma substances or air fresheners.

15 The detailed design according to claim 7 is intended to maintain an initially established uniform distribution of the microcapsules on or in the laminated composite material.

20 The detailed design according to claim 8 ensures a mechanical reinforcement of the liquid-impermeable layer.

25 In this connection, a supporting layer according to claim 9 is both inexpensive and light, but at the same time is fully adequate for applications in which the supporting layer substantially serves as a spacing member between the liquid-impermeable layer and substrate of the laminated composite material.

30 The embodiment according to claim 10 in addition prevents the laminated composite material from slipping on a backing or substrate.

35 An additional cover layer according to claim 11 provides on the one hand protection for the liquid-absorbent layer, for example against mechanical action, and on the other hand,

particularly if the liquid-absorbent layer is hydrophobic, ensures that the user's body is again additionally insulated against accumulation of liquid in the liquid-absorbent layer.

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According to claim 12, the bonding of the cover layer to the liquid-absorbent layer enables endless laminated composite materials having a cover layer to be produced.

10 The invention is described in more detail hereinafter with the aid of examples of implementation and with reference to the accompanying drawings, in which:

15 Fig. 1 is a section through a cut-out portion of a laminated composite material;

Fig. 2 is an enlarged cut-out portion of a pile layer of the laminated composite material of Fig. 1;

20 Fig. 3 is a plan view of an alternative laminated composite material, viewed from the support side, and;

25 Fig. 4 is a plan view of yet another alternative laminated composite material viewed from the side next to the user's body.

The laminated composite material identified overall in Fig. 1 by the reference numeral 10 is a flexible sheet 30 material that may be adapted to the body contour of a user.

Starting from a support layer 12, which is shown as the bottom layer in Fig. 1 and consists of a resistant hydrophobic plastics fibre material, the laminated composite material 10 contains the following further 35 layers: a liquid-impermeable sheet 14 of a polymer material (for example polyethylene), a fleecy material layer 16 of

cotton, as well as a cover/woven fabric layer 18 of air-permeable and liquid-permeable textile material. The fleecy material layer 16 is in turn composed of two layers, namely a fleecy material base layer 20, to which the sheet 5 14 is bonded, and a pile layer 22.

The support layer 12 as well as the fleecy material layer 16 are bonded over the whole surface to the sheet 14.

10 The pile layer 22 in the unloaded state of the laminated composite material 10 is about three times thicker than the fleecy material base layer 20. The pile layer is composed of a plurality of individual cotton fibres 24 (see Fig. 2) that project from the fleecy material base layer 20.

15 The cover/woven fabric layer 18 is loosely bonded to the
fleecy material layer 16.

The structure of the fleecy material layer 16 will become
20 clear from the cut-out portion of the laminated composite
material 10 of Fig. 1, illustrated in Fig. 2: a plurality
of cotton fibres 24, which extend between the fleecy
material base layer 20 and the cover layer 18, form the
pile layer 22.

25 As is illustrated in particular in the enlarged cut-out portion of Fig. 2 in the region of a cotton fibre 24, microcapsules 28 adhere to the cotton fibres 24 by means of a bonding agent 26.

30 The microcapsules 28 have a covering 30, for example of gelatin, in which a liquid substance 32 is accommodated. The covering 30, which can be degraded or destroyed by pressure, temperature or moisture, is only very slightly 35 permeable to the substance 32, with the result that only a small amount of substance escapes outwardly from the interior of the covering 30 per unit time.

As an alternative to a fleecy material layer 16, the laminated composite material 10 may also include a fleece, for example a woollen fleece.

5 The support layer 12 may, when the laminated composite material 10 is used as a bed inlay, also be a flexible network 34 (see Fig. 3) consisting of a material with a high coefficient of friction, e.g. rubber, the slipping of the laminated composite material 10 on a backing thereby 10 being prevented. The flexible network 34 is bonded to the sheet 14, but alternatively may also be welded or stitched to the latter.

In the production of endless strips of the laminated composite material 10, the cover layer 18 is not formed as a loose layer, but is bonded to the fleecy material layer 16 as illustrated in Fig. 4. For the sake of better comprehension part of the cover layer 18 has been omitted in Fig. 4 in order to provide a view of the underlying 20 fleecy material layer 16. The fleecy material layer 16 carries portions of adhesive on a plurality of bonding positions 36 arranged in the manner of a grid. The adhesive arranged in this way bonds the cover layer 18 at separate points to the fleecy material layer 16. In this 25 way a sufficient area through which an exchange of air or moisture is possible remains even when an impermeable adhesive is used between the bonding positions 36.

As an alternative to bonding, the sheet 14 may also be 30 welded to the support layer 12 or to the fleecy material layer 16 or to the fleece.

The function of the laminated composite material 10 is as follows:

35 If the laminated composite material 10 is used, for example as a bed inlay, bed sheet or as an article of underwear,

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the cover/woven fabric layer 18 faces the user's body. Body fluid released by the user penetrates the cover/woven fabric layer 18 and is absorbed by the fleecy material layer 16. The body fluid is distributed by diffusion over 5 a large area of the laminated composite material 10, with the result that in the region of the cover/woven fabric layer 18 there is no unpleasant accumulation of liquid.

10 The sheet 14 serves as a liquid trap, so that the user's body fluid cannot penetrate the laminated composite material.

15 Due to the absorption of the body fluid in the fleecy material layer 16 and/or in the fleece, the body fluid is dissipated away from the user's body, so that the latter remains dry.

20 A further application of the laminated composite material 10 is in the long-lasting use of volatile substances or odoriferous substances.

25 A volatile substance 32, for example a menthol or herbal extract for improving the permeability of the respiratory pathways, or a fragrance, escaping through the coverings 30 of the microcapsules 28 penetrates the cover/woven fabric layer 18 over a long period of time, which may be predetermined via the substance concentration and the permeability of the covering 30, and is inhaled by the user when the latter breathes.